

**Section II (Remarks)****A. Summary of Amendment to the Claims**

By the present Amendment, claims 1 and 9 have been amended. Claim 8 has been cancelled and claims 2-5 and 14-19 were previously cancelled. No new matter within the meaning of 35 U.S.C. §132(a) has been introduced by the amendment of claim 1, as detailed under heading B below. Claim 9 has been amended to cite proper dependency on claim 7, in view of the cancellation of claim 8.

The amendments made herein are fully consistent with and supported by the originally-filed disclosure of this application.

**B. Rejection of Claims Under 35 U.S.C. §112, First Paragraph – Written Description**

In the Office Action mailed May 24, 2011 the examiner rejected claims 1 and 6-13 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. In particular the examiner alleged that recitation of a *fadL* gene with a C-terminal truncation encompasses “any *fadL* gene with deletions of any number of C-terminal amino acids, as long as those following the ninth loop are amongst those deleted” and that “one of ordinary skill in the art could not reasonably predict which of the C-terminal truncated FadL proteins would, when fused to a target protein encoding gene, yield the result of expression on the surface of the cell.” (Office Action mailed May 24, 2011, p. 5.)

Applicants respectfully direct the examiner’s attention to Section I above, where claim 1 has been amended to recite that the particular portion of the *fadL* gene that has been removed is “the C terminal end (nucleotides 1156-1347) of the *fadL* gene” and the *fadL* gene is identified as deposited as GenBank Accession No. U00096. By such amendment it is clear that the only deletion from the *fadL* gene is the nucleotides at positions 1156-1347.

Support for the amendment is provided in the knowledge of one of skill in the art. The sequence of the *fadL* gene is well known in the art and is deposited GenBank Accession No. U00096. For the examiner’s reference, a printout of GenBank Accession No. U00096 is attached hereto as Exhibit A.

Furthermore, it is well known in the art that nucleotides 1156-1347 of the fadL gene are positioned on the ninth loop of the fadL gene. Attached hereto for the examiner's reference, as Exhibit B, is a 2000 article, Cristalli, et al., *Arch. Biochem. Biophys.* 377:324, 2000 (hereinafter referred to as "Cristalli et al."), where in Figure 8(B) it is seen that the ninth loop is an external loop and that the 384<sup>th</sup> amino acid (corresponding to the 1155<sup>th</sup> nucleotide) is positioned on the ninth loop. (Cristalli et al. was cited at page 4 of the application, as filed and oprovided as Reference AM in the IDS filed on August 8, 2006). Those of skill in the art could readily obtain a *fadL* gene in which C-terminal end (1156<sup>th</sup> -1347<sup>th</sup> nucleotides) is removed by performing the experiment described in Example 1 of the present application. The amendment of claim 1 is therefore supported by the originally-filed disclosure of the application and supported by the knowledge of those of skill in the art.

Applicants respectfully submit that the claim, as amended, is supported by the specification and complies with the written description requirement.

Dependent claims 6, 7, and 9-13 are in compliance with the written description requirement for the same reasons advanced above with regard to claim 1, from which claims 6, 7, and 9-13 depend. Withdrawal of the rejection is respectfully requested.

#### C. Rejection of Claims Under 35 U.S.C. §112, Second Paragraph – Indefiniteness

In the Office Action mailed May 24, 2011 the examiner rejected claims 1 and 6-13 under 35 U.S.C. §112, second paragraph as indefinite. In particular the examiner alleged that recitation of the phrase "all of the base sequence following the ninth loop of the fadL gene has been removed" is indefinite in that "it is not clear what is intended by the ninth loop of the fadL gene." (Office Action mailed May 24, 2011, p. 7.)

The examiner's attention is respectfully directed to Section 1 above, where claim 1 has been amended to clarify that the nucleotides removed are nucleotides 1156-1347 of the fadL sequence deposited as GenBank Accession No. U00096.

Amended claim 1 now recites in relevant part "...the vector comprising a *fadL* gene (GenBank Accession No. U00096) encoding an *E. coli* outer membrane protein (FadL) in which the C terminal end (nucleotides 1156-1347) of the *fadL* gene has been removed..."

As such, claim 1 is supported by the specification by the description of all of the FadL protein, the *fadL* gene the truncation of “the C terminal end (nucleotides 1156-1347) of the *fadL* gene” and the resulting DNA fragment. As amended, claim 1 is sufficiently definite to comply with the requirements of 35 U.S.C. § 112, second paragraph. Claims 6, 7, and 9-13 are correspondingly definite, for the same reasons advanced above with regard to claim 1, from which claims 6, 7, and 9-13 depend. Withdrawal of the rejection is respectfully requested.

**D. Rejection of Claims Under 35 U.S.C. §102/103**

In the Office Action mailed May 24, 2011, the examiner rejected claims 1, 7, 11 and 12 under 35 U.S.C. §102, or alternatively, 35 U.S.C. §103 as unpatentable over Azizan et al., *J. Bacteriology*, 176, 21, 6653-6662, 1994 (hereinafter “Azizan et al.”). Applicants respectfully disagree.

Anticipation of a claim requires the disclosure in a single prior art reference of each element of the claim under consideration. (*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).)

Initially, the examiner’s attention is respectfully directed to the discussions under headings B and C above. As detailed herein, independent claim 1 has been amended to clarify that the vector comprises, in relevant part, a *fadL* gene with the C terminal end (nucleotides 1156-1347) of the *fadL* gene deleted. By such amendment it is clear that the only deletion from the *fadL* gene is the nucleotides at positions 1156-1347.

As cited by the examiner, “Azizan et al. disclose a vector for expressing a target protein (phoA) comprising a *fadL* gene encoding an *E. coli* outer member protein (FadL), having a deletion of some part of the C-terminal end of the protein, fused to a target protein which is phoA (see Fig. 1).” However, Azizan et al. fails to describe a vector comprising a *fadL* gene with nucleotides 1156-1347 deleted, as recited in independent claim 1 of the present application. Accordingly, Azizan et al. does not anticipate the subject matter of claim 1.

Alternatively, the examiner cited Azizan et al. as rendering the claimed invention obvious. It is the examiner’s assertion that “there is likelihood that at least the amino acids after the ninth loop are deleted...” (Office Action mailed May 24, 2011, p. 8), however no support is provided for this assertion. Azizan does not provide any guidance regarding which amino acids of the *fadL* gene are deleted and/or which location of the *fadL* gene is a proper fusion site for target protein

display on a cell surface.

The examiner's attention is respectfully directed to Exhibit C hereto, providing the reference: Lee, et al., *Biotech. and Bioeng.*, vol. 90, no. 2, April 20, 2005. Lee et al. was published after the 2004 priority date of the present application. In Lee et al., at pages 226-229, in the "RESULTS and DISCUSSION" section, location of a proper fusion site for target protein display on a cell surface is essential for a success of cell surface display. Accordingly, the selection of a location of a proper fusion site is essential. Azizan et al. provides no such guidance. Azizan et al. fails to provide any derivative basis for the claimed invention. Accordingly, no basis of *prima facie* obviousness of the claimed invention is presented by Azizan et al.

The present inventors determined which nucleotides of the *fadL* gene should be deleted and also determined which location of the *fadL* gene is a proper fusion site for target protein display on a cell surface.

Based on the foregoing, Azizan et al. fails to provide any logical basis for the vector recited in claim 1 and claims 7, 11 and 12, dependent therefrom. Azizan et al. does not render the claimed invention obvious. Accordingly, withdrawal of the rejection of claims 1, 7, 11 and 12 under 35 U.S.C. § 103 (a) as being obvious over Azizan et al. is respectfully requested.

### CONCLUSION

Based on the foregoing, all of applicants' pending claims 1, 6, 7, and 9-13 are patentably distinguished over the art, and in form and condition for allowance. The examiner is requested to favorably consider the foregoing and to responsively issue a Notice of Allowance.

No fees are believed to be due for the filing of this paper. However, should any fees be required or an overpayment of fees made, please debit or credit our Deposit Account No. 08-3284, as necessary.

If any issues require further resolution, the examiner is requested to contact the undersigned attorneys at (919) 419-9350 to discuss same.

Respectfully submitted,

/steven j. hultquist/  
Steven J. Hultquist  
Reg. No. 28,021  
Attorney for Applicants

/kelly k. reynolds/  
Kelly K. Reynolds  
Reg. No. 51,154  
Attorney for Applicants

HULTQUIST IP  
P.O. Box 14329  
Research Triangle Park, NC 27709  
Phone: (919) 419-9350  
Fax: (919) 419-9354  
Attorney File No.: 4240-148-RCE

Enclosures:  
Exhibit A  
Exhibit B  
Exhibit C

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